DOCUMENT RESUME

ED 137 128 SE 022 394

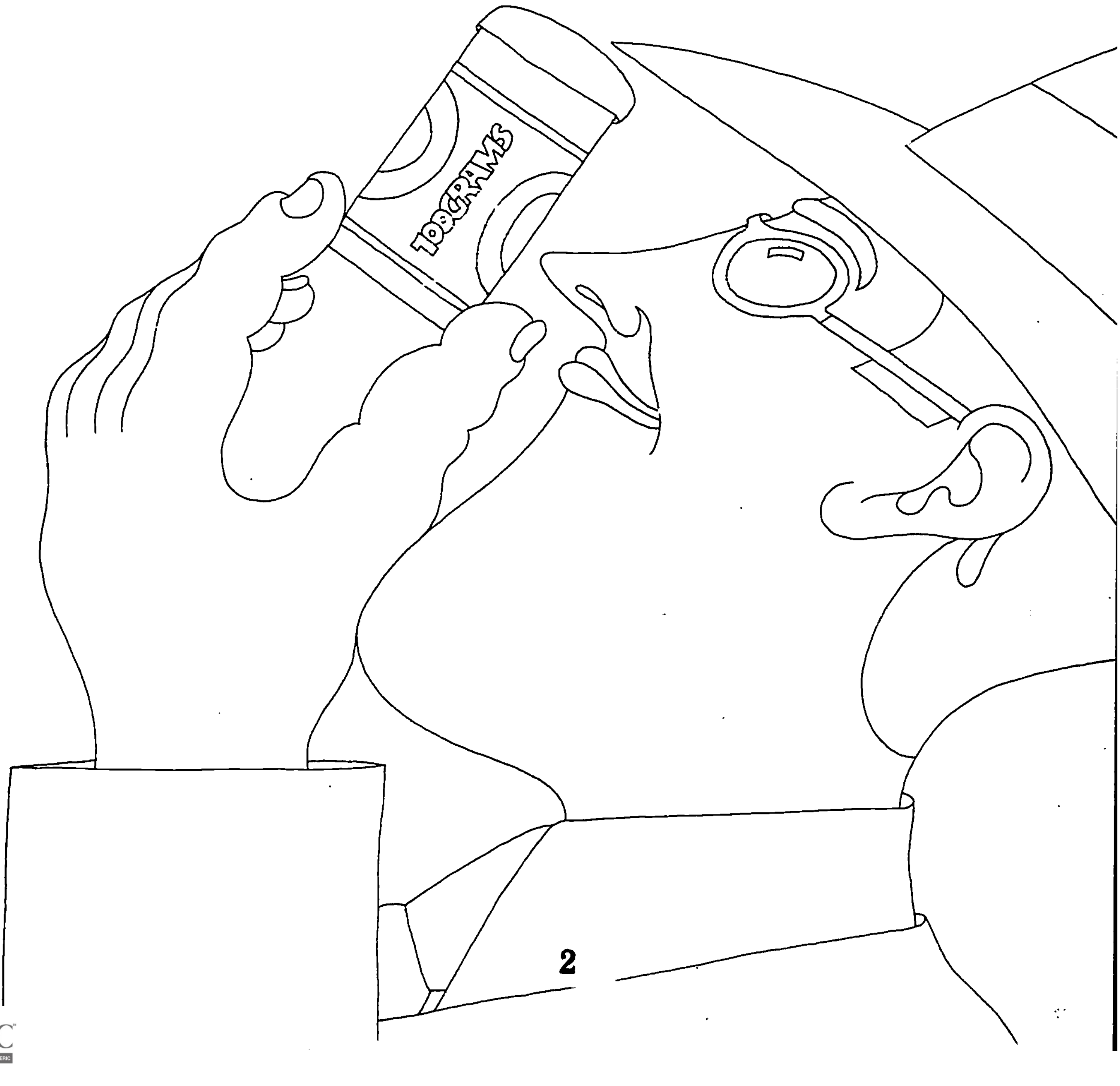
TITLE Metric Measures and the Consumer. Reprint from FDA CONSUMER, Dec. 1975-Jan. 1976.
INSTITUTION Food and Drug Administration (DHEW), Washington, D.C.
REPORT NO FDA-76-1018
PUB DATE 76
NOTE 9p.
AVAILABLE FROM Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 (Stock Number 017-012-00232-3, $0.45; There is a minimum charge of $1.00 for each mail order)

EDRS PRICE MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS Bulletins; Consumer Education; Elementary Secondary Education; *Mathematics Education; *Measurement; *Metric System

ABSTRACT

Advantages of the metric system for the consumer are discussed. Basic metric units are described, then methods of comparison shopping when items are marked in metric units are explained. The effect of the change to the metric system on packaging and labelling requirements is discussed. (DT)

Metric Measures And The Consumer



If you're a consumer—and who isn't—you may be thinking metric sooner than you think. But don't panic—chances are you've already been exposed to some parts of the metric system of weights and measures at one time or another and further indoctrination is likely to be just as gradual. Once you give it a fair try, once you get the hang of it, you may find you can think faster and more accurately in metric than in the system we use now.

U.S. consumers don't need to be told that they're putting more money where their mouths are, and they're getting more concerned about the budget bite for each mouthful. In Paris, Buenos Aires, Cairo, and Calcutta, and practically every other place in the world, consumers feel the same pain in the pocketbook when they buy food or drink, but they can usually figure out the extent of it without a pocket calculator.

For this they are beholden to the metric system of weights and measures. Metric is now being used by ordinary consumers in almost every country in the world. Its simplicity in everyday use is that its units, subunits, and multiples of units for a given physical measurement—weight, capacity or volume, length or distance, area, or temperature—are based on factors of ten or tenths. Thus, no complicated mental arithmetic is needed to convert from one value to another or to relate these values to the decimalized money systems most countries have today. The decimal does most of the work, and no battery changes are necessary.

The basic unit in the metric system of weights is the gram, much smaller than the ounce we are used

Metric Measures And The Consumer

It will take some getting used to, but metric is a considerably simpler system of weights and measures than the one we use now. Because the metric system is based on units of 10, most consumers probably will find it easier to compare food costs when dealing in grams and kilograms than in ounces and pounds.

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to dealing with. You might have trouble telling whether an object weighs a few grams or several, but metric scales don't, and more precise weighing is possible than by the fractions of ounces you commonly see on some product packages.

There are about 28 grams in an ounce. A thousand grams make a kilogram, which comes out to a little over two pounds.

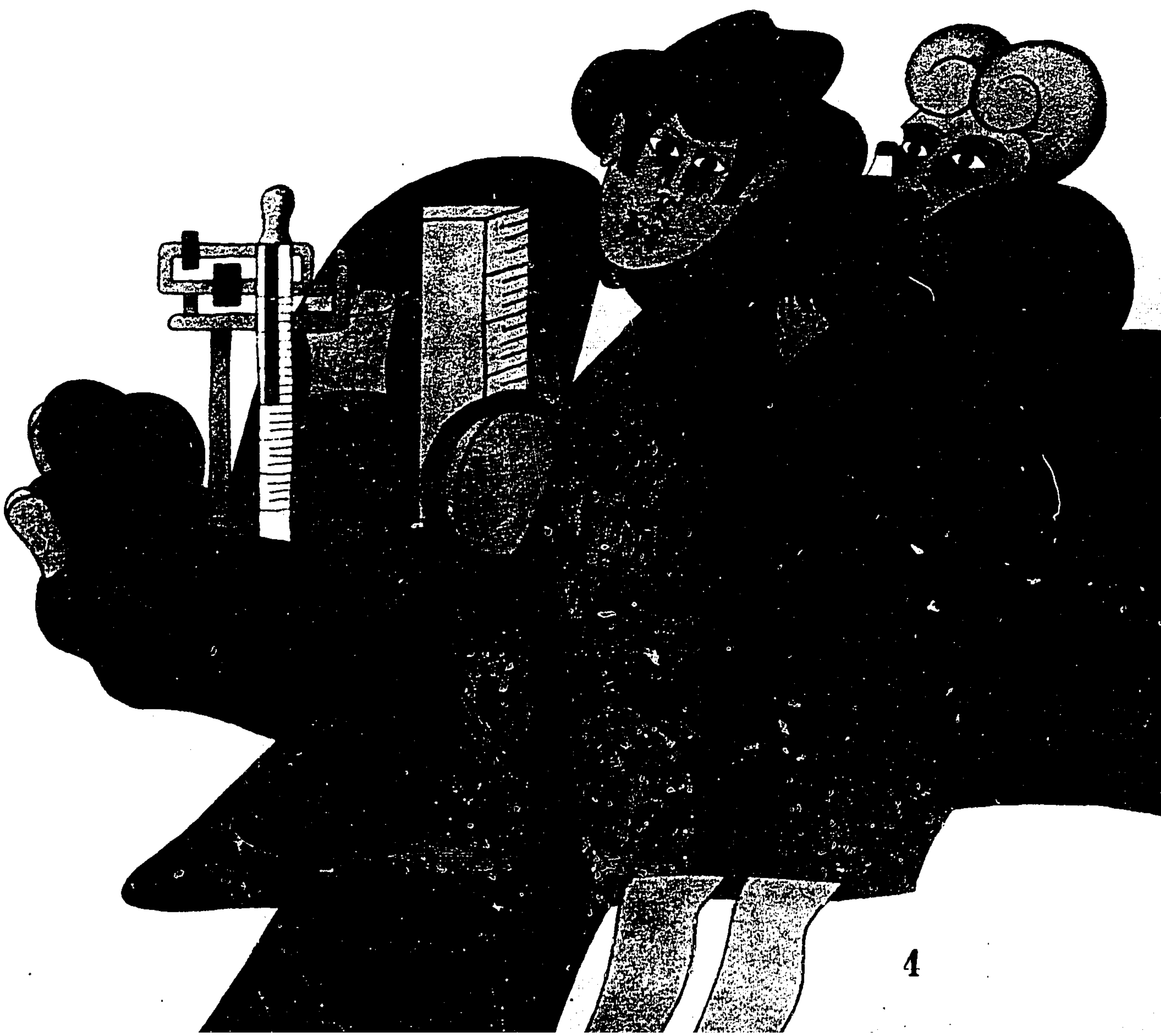
Suppose that at some future time you walk into the grocery and everything, or practically everything, is packaged by metric measure. Maybe you decide immediately that the first thing you'll want when you're at home recovering from the ordeal is a cup of coffee, so you put that at the top of your shopping list.

Let's say that a 1-kilogram (1,000-gram) can of coffee sells for $2.25 and you want to know what it costs in smaller amounts. Just keep an eye on the decimal as it moves one unit to the left each time you divide by 10:

1,000 grams (1 kg)	$2.25
100 grams (.1 kg)	$.225 (22.5 cents)
10 grams (.01 kg)	$.0225 (2.25 cents)
1 gram (.001 kg)	$.00225 (0.225 cents)

In the foregoing table the decimal moves to the left, to signify division—into tenths, hundredths, and thousandths. To multiply, you simply move the decimal in the opposite direction.

Let's say flour costs $.00044 per gram. That's not



much money, but a gram is not much flour either. So you want to know what larger amounts cost:

1 gram (.001 kg)	$.00044	(0.044 cent)
10 grams (.01 kg)	$.0044	(0.44 cent)
100 grams (.1 kg)	$.044	(4.4 cents)
1000 grams (1 kg)	$.44	(44 cents)

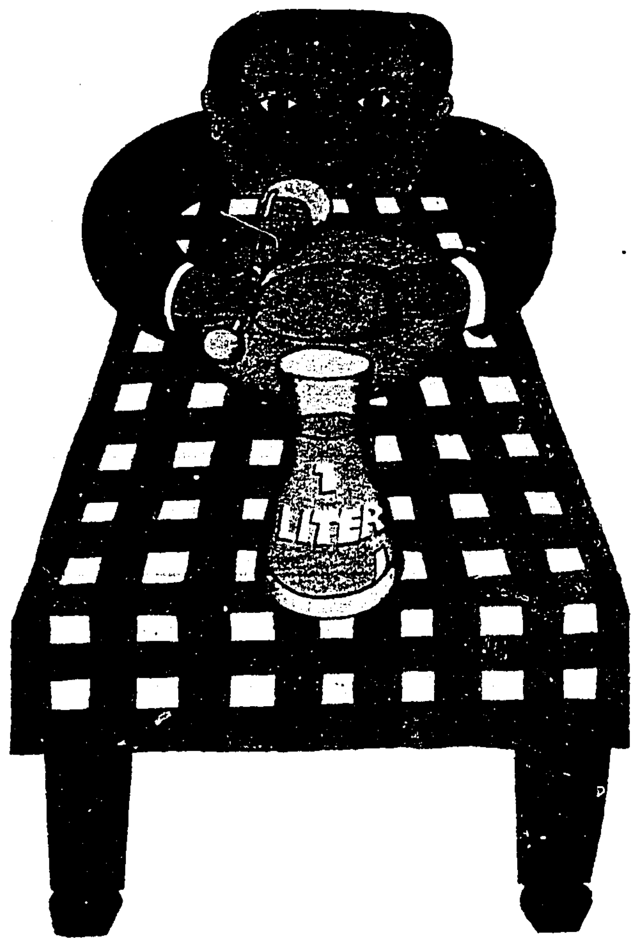
Comparison shopping when using the metric system is relatively easy when two package sizes vary in amount of contents. If a 1-kilogram (1,000-gram) jar of peanut butter costs $1.95, and a 900-gram jar costs $1.78, which jar gives you the most for the money? Since it's easy to find the cost of 100 grams of the 1-kg size (one-tenth of $1.95 or 19.5 cents), you can add this 100-gram cost to the $1.78-cost of the 900-gram jar and the total is $1.975, or 2.5 cents more for 1,000 grams than the larger size. It's not nearly as easy to figure out the best buy, when using the U.S. avoirdupois system, between a 1-pound (16-ounce) jar at $0.79 and a 15-ounce jar at $0.72, because of the difficulty in computing the cost of an ounce.

Some stores now are displaying shelf tags showing the unit price of packaged products. These tags usually state the cost of the item per ounce or pound, or per square foot for paper or similar goods. Unit pricing will continue to be helpful to consumers even after metric measurements are in general use.

Along with weight, the consumer of food and drugs is most concerned about measurement of capacity or

Some Common Metric Amounts and U.S. Equivalents

Weight	
Gram	0.0352 oz.
Kilogram (1,000 grams)	2.204 lbs. / 35.274 ozs.
Metric Ton (1,000 kg.)	2,204.6 lbs.



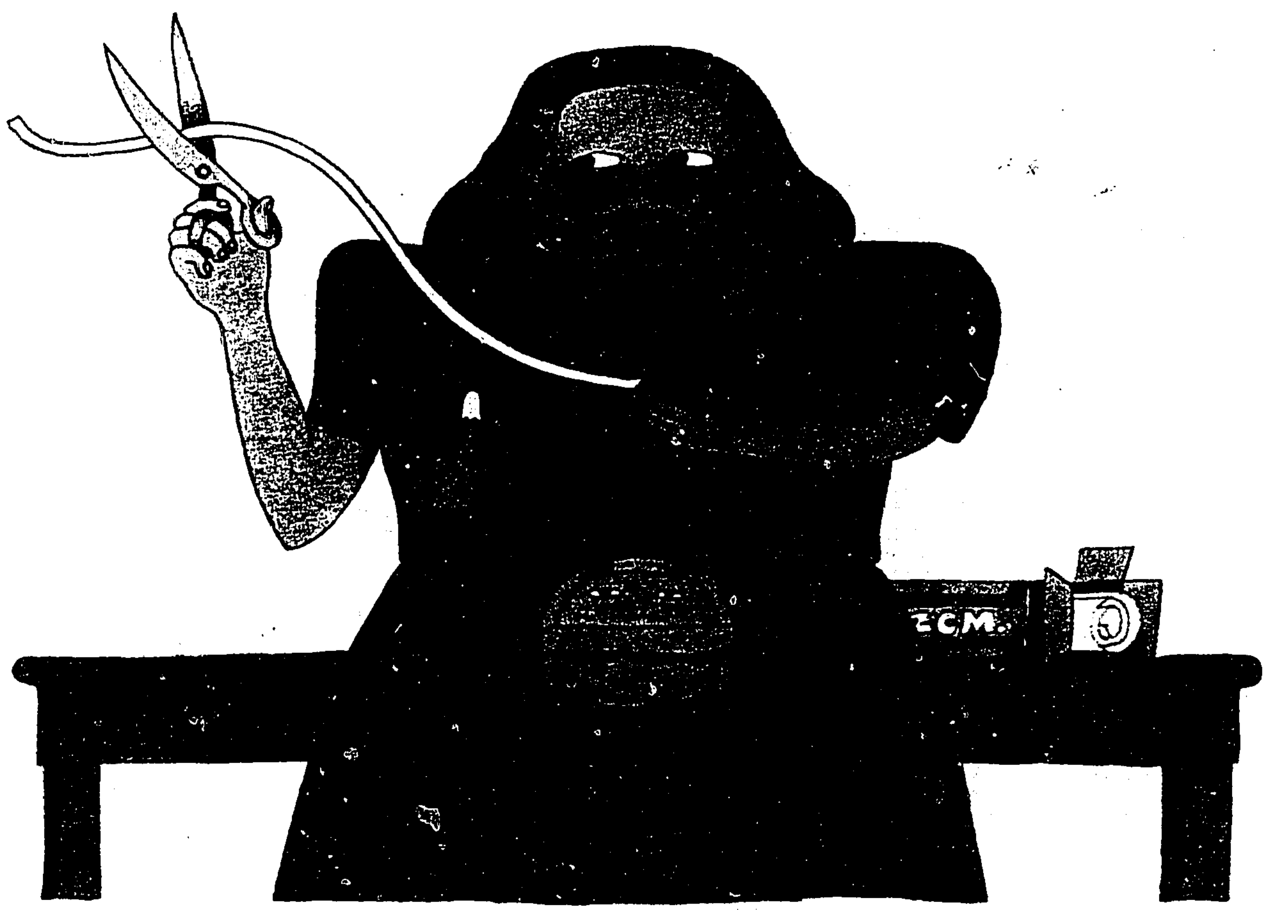
Volume	
Liter (1,000 milliliters)	1.056 quarts

volume, in both liquid and dry measure. Here the patchwork of standards in the U.S. system of measurement, along with the difficulty of converting amounts of smaller units to larger ones (or vice versa) and of calculating costs, are enough to discourage all but the most persistent, methodical, and mathematically inclined shopper.

Capacity is based on cubed dimensions. In U.S. liquid measure the number of cubic inches in a gallon is 231. This breaks down to 1 103/128 cubic inches in a fluid ounce, and that number must be multiplied by the number of fluid ounces in a container to find the total number of cubic inches—or must be divided into the total cubic inches in a container to find the total fluid ounces. Try that on your abacus!

In the dry measure used for bulk amounts of such products as grain or fruit, units range from 33.60 cubic inches in a pint to 2,150.42 cubic inches in a bushel. But the pints and quarts we use in dry measure do not correspond in actual capacity to those we use in liquid measure. Units of dry measure are sometimes verified by weighing, and because of the various densities of food commodities, the weights may vary for the same dry measure unit. The weight fixed by the U.S. Government for a bushel of wheat, for instance, is 60 pounds, and for a bushel of oats, 32 pounds. There are still other variations, and some States fix official weights that vary from the Federal standards.

The metric standard unit of capacity is the liter, for both liquid measurement and dry measurement such as that used for dry products in recipes. The liter



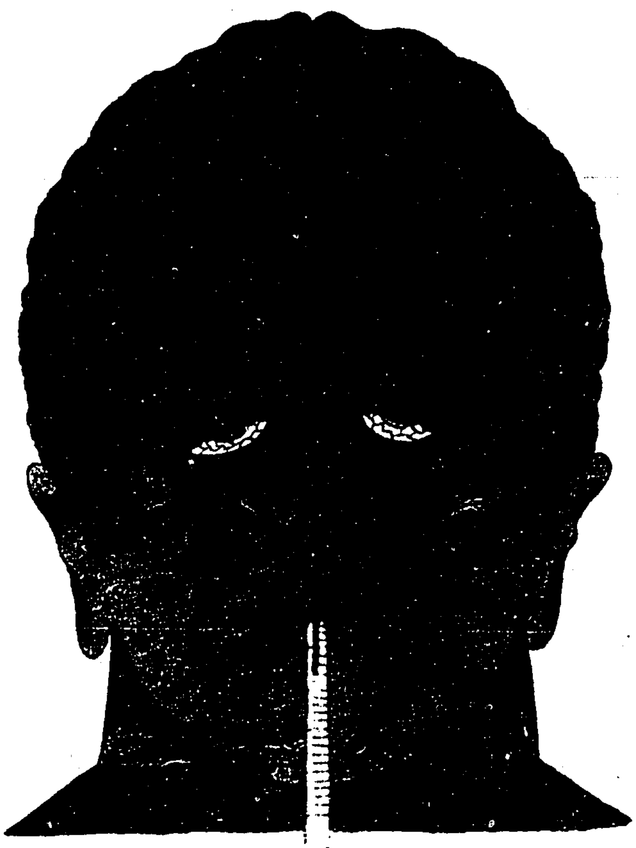
Length	
Millimeter (0.001 meter)	0.03937 inch
Centimeter (0.01 meter)	0.3937 inch
Decimeter (0.1 meter)	3.937 inches
Meter (1,000 millimeters)	39.37 inches/3.2808 feet/1.1 yards
Decameter (10 meters)	393.7 inches/32.808 feet/11 yards
Kilometer (1,000 meters)	0.62137 mile/3280.8 feet

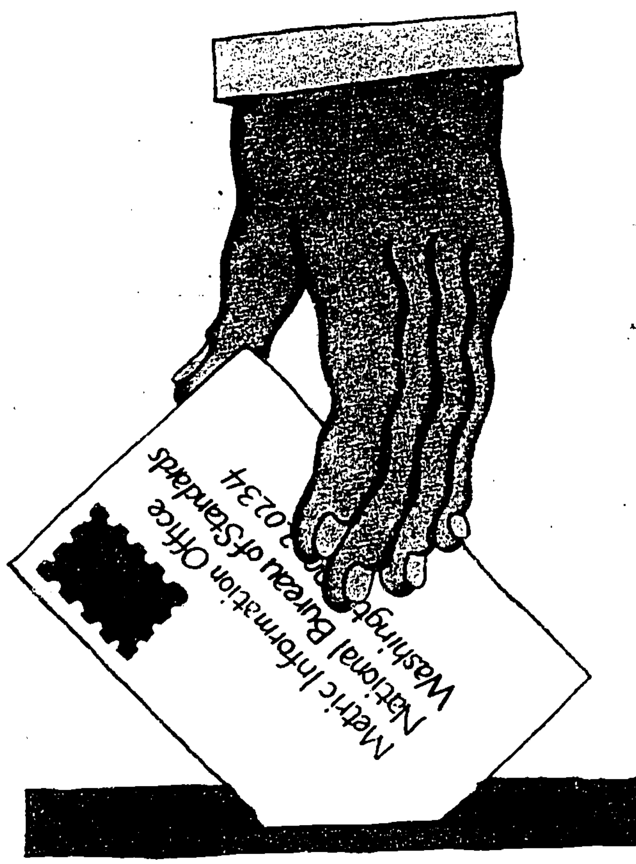
contains a little less than a U.S. dry measure quart and a little more than a U.S. liquid measure quart. The liter is derived from cubing a tenth of the metric unit of length, the meter. The meter (about 39.4 inches or 3.3 feet) is divided into thousandths (millimeters), hundredths (centimeters), and tenths (decimeters). The liter is equal to 1 cubic decimeter, or one-thousandth of a cubic meter.

Because of the metric system's simplicity and precision, its wide use, and its ready accommodation to decimal monetary systems, the number of countries officially going metric has increased steadily since the system was developed in France and adopted there in the 1790's (along with a decimal monetary system). The rate of adoption has been rapid (25 countries in the past 10 years). The United States officially committed itself to a metric future with enactment by the Congress on December 23, 1975, of the Metric Conversion Act, declaring a national policy of coordinating the increasing use of the metric system in this country and establishing a board to coordinate voluntary conversion to the metric system. This leaves only Brunei, Burma, Liberia, and Yemen officially uncommitted to the metric system.

Although the marriage of metrication and decimalized money was made not in heaven but in 18th century France, those who had noted its widespread success felt that the sooner a similar match took place in this country the better. U.S. proponents for joining the rest of the world had become increasingly vocal in urging official adoption of metric and in exhorting individual citizens, consumer groups—anyone who would listen—to think metric.

The difficulty in thinking metric when you are used to thinking in other terms is indeed the most immediate obstacle to incorporating metric into our economy and way of life. If you heft an object, a lifetime of





Temperature	Celsius	Fahrenheit
Water freezes	Zero	32
Water boils	100	212
Body temperature	37	98.6
Pleasant summer temperature	26.7	80

Educational Materials

Educational materials concerning the metric system can be obtained and specific questions concerning the system will be answered by writing to the Metric Information Office, National Bureau of Standards, Washington, D.C. 20234.

conditioning tells you to think of its weight in ounces or pounds, or fractions of them. Mentally converting this to the metric equivalent isn't easy. Many metric proponents believe it would be better—if you can do so—to forget ounces and pounds and think of what you're hefting only in terms of grams (tens or hundreds of them) or kilograms. Some suggest that one way to begin is by learning the metric weights, capacities or dimensions of familiar objects, containers, distances, and areas.

But the biggest and most discommoding obstacle is the long range one that would result from superimposing the metric system on an economy and culture in which most of the things we can see, touch, and feel are already laid out under a system that has worked—and still does. Wholesale change would require replacement of measuring instruments, machine tools, other equipment, and manuals and textbooks. Therefore, some aspects of the present system almost certainly will be with us long after the metric system comes into common use. It would be wasteful to discard many of the things we possess, even measuring tools and instruments, simply because they do not precisely fit metric standards.

Nevertheless, it's becoming increasingly obvious that the metric way of life is going to occupy a larger place in all our futures. Besides its intrinsic merits, metric is the only kind of commercial language in which our exporters may sell and trade their goods to the rest of the world so that there is no misunderstanding at either end of the transaction. For this reason, more and more companies have been adding to their product labels the separate metric equivalent measure of contents after stating the ounces, pounds, gallons, fluid ounces, bushels, or similar measures required by law. Some companies have done so by consumer demand.

The Food, Drug, and Cosmetic (FDC) Act of 1938 requires that packaged foods, drugs, and cosmetics carry on their principal label panels the designation of contents in weight, measure, or numerical count "in terms likely to be read and understood by the ordinary individual under customary conditions of purchase and use." But the Fair Packaging and Labeling (FPL) Act of 1966 imposes additional requirements for labeling of food, nonprescription drugs, and cosmetics, including a provision that contents must be listed under the existing U.S. measurement system. These products are regulated as to labeling by both laws. Prescription drugs are exempted from FPL Act requirements and thus are regulated solely under the FDC Act.

Official adoption of the metric system to the exclusion of the existing U.S. system would require congressional amendment of the FPL Act to specify metric label statements for food, nonprescription drugs, and cosmetics. FDA's regulations for food, nonprescription drugs, and cosmetics permit separate additional statements of metric equivalents on the principal panel or other parts of the label and many manufacturers now carry such statements. The use of either the U.S. or metric system is permitted for label statements of the active ingredient strength of each dosage unit in packages of nonprescription drugs.

For prescription drugs, FDA regulations permit the use of either the U.S. or metric system for required labeling. The prescription drug industry generally has chosen to use the metric system, because of the greater need for precise measurements and because physicians and pharmacists, for whom most labeling is intended, are trained in the metric system by their scientific backgrounds. (The metric system is in almost universal use in the physical sciences in both this and other countries.)

FDA, of course, has been well aware of the metric writing on the wall, and has kept this in mind for any appropriate new action or program. For example, its new regulations for nutrition labeling of foods are based on use of metric measurement for calculating the percentages of the U.S. Recommended Daily Allowances for nutrients per serving and for listing the quantities of certain nutrients. The compelling reason for using metric here is that the quantities involved are so small it would be confusing to calculate or declare them in the small fractions of ounces that would be necessary for accuracy.

An FDA advisory panel that reviewed over-the-counter laxatives for safety, effectiveness, and labeling claims has recommended that active ingredients in individual dosages of a container be listed on the label in metric measurement, and FDA is considering making this recommendation applicable to all categories of over-the-counter drugs.

FDA is beginning to encourage full and more conspicuous use of separate statements on labels of foods, nonprescription drugs, and cosmetics in metric equivalents of the required U.S. units.

One of the most critical aspects of a change to the metric system so far as it concerns the consumer would be the modest-to-extensive changes in packaging needed for most food and drug products to take full advantage of the system. Obviously, it is desirable not only for packages to be in sizes convenient to use but also for the contents to be in round metric numbers. This makes it easier for the consumer to determine the value of his purchase and to use the metric information for purposes such as determining the number of servings and recipes in a food package.

These changes could involve considerable costs to and effort by the industries concerned and would necessitate a familiarization period for both industry and the consumer, but once completed would be beneficial to all.

Two aspects of such changes present special difficulties. One, standardization of package sizes, involves the food and drug industries as a whole as well as individual companies in any given industry. The other, standardization of can sizes, involves only the food canning industry.

Standardization of package sizes—that is, limiting the number of sizes to those that are most useful and lend themselves to easy calculation of costs—holds certain advantages for both industry and the consumer. Standardization can help the manufacturer keep his expenses down in practically all aspects of ordering, purchasing, processing, labeling, and distribution. It can help the consumer to familiarize himself with and begin using metric amounts—in other words, to think metric. Round numbers such as 10 grams, 100 grams, multiples of 100 grams, and 1 kilogram, and similar amounts in subunits of liters, would be a convenience to the consumer. So would simple portions of the kilogram, such as 50 grams (close to two ounces), 250 grams (close to a half pound), and 500 grams (close to a pound), and similar portions of the liter.

All these considerations apply to canned foods, but the canning industry also faces the formidable task of developing standards for heat treatment that will assure sterility or safety of the food product, based on the new container sizes and the kind and density of the particular food.

FDA cannot unilaterally impose standard package or container sizes on manufacturers; these standards must be worked out by agreement with trade groups representing a specific industry or group of industries. Some of this initial work is going on now on intra-government, intra-industry, and joint industry-government bases.

One recent move toward the metric system has been rulemaking by the U.S. Bureau of Alcohol, Tobacco Products, and Firearms to require standardized metric sizes for containers of domestic and imported wines by 1970. The Bureau has at the request of U.S. winemakers designated seven metric sizes for all wines sold after 1978 except for those bottled before a certain date. During the interim period before full conversion existing bottles may be used. Whether old sizes or new, labels during the interim period will be required to state the quantity in both metric amounts and U.S. fluid ounces and decimal fractions of them. The Bureau has proposed similar regulations for distilled spirits.

The move toward adopting metric as a national policy is increasing in tempo. The legislation enacted by Congress establishes a United States Metric Board to plan, coordinate, and carry out a policy of encouraging and supporting increased use of metrication and voluntary substitution of metric measurement units in education, trade, commerce, and other parts of the economy. The board will encourage participation by these groups, look for ways to promote efficiency and keep conversion costs down, and help in developing a broad program of education in the metric system for school children, college students, and the public.

The new law does not specify a timetable or target date for going metric nationwide, but appointment of the board provides a mechanism for moving deliberately in that direction. The board will include representatives of industry, labor, business, agriculture, commerce, the consumer, education, construction industry, science and engineering, State and local government, and others.

The manufacturing sector of the economy will be represented in the move to metric by the American National Metric Council, which will work with the United States Metric Board provided for in the legislation, Public Law 94-168. Many trade organizations and individual companies and institutions have already taken some initial action or expressed their intentions of moving toward metric.

The metric system was born of the French Revolution, and was meant to be a system of fair dealing truly representative of and beneficial to the common people. Its developers, sick of manipulations of measures by kings as a way of imposing new taxes and customs, conceived of a system of measurements based on a constant of nature, instead of princely whim. The resulting meter, on which the rest of the system rested, was considered by the imperfect science of the time to be equal to one ten-millionth of the distance from the North Pole to the Equator. As has been shown since, it was not exact, but remarkably close.

The American Revolutionaries of the same period were tired of kings, too, but some of the new Republic's leaders became alarmed at the more radical excesses of the French uprising and the instability that accompanied it. With George III no longer in a position to collect taxes from them, they decided the old system of measurements developed in the mother country was worth keeping after all and would facilitate much needed trade. They settled for a decimal money system.

But the metric system found increasing support in the non-English-speaking world. By 1866 the United States sanctioned the metric system on a legal but not mandatory basis, and in 1875 signed a treaty to adopt it, but it was never put into common use.

Meanwhile, the metric system has continued to gain adherents. Now that the United States is moving toward metric, all but 2/1000th (that's 0.2 percent!) of the earth's population eventually will be conducting their temporal affairs under the metric system. At that point, the system, as its Revolutionary developers intended, will truly be one that not only serves practically all the people, but takes the measure of all their works and institutions.

U.S. GOVERNMENT PRINTING OFFICE 1976 O - 225-131

FDA Consumer
REPRINTED FROM DEC. 1975 - JAN. 1976

Publication No. (FDA) 76-1018

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service
Food and Drug Administration
Office of Public Affairs